

September 10, 2015

Comments on the U.S. Army Corps of Engineers Draft Evaluation of the San Jacinto Waste Pits Feasibility Study Remediation Alternatives, August 2015, provided on behalf of the Port Authority of Houston Authority

Introduction

On behalf of the Port of Houston Authority (PHA), HDR, Inc. ("HDR") has performed a technical review of the U.S. Army Corps of Engineers ("ACOE") Draft Evaluation of the San Jacinto Waste Pits Feasibility Study Remediation Alternatives dated August 2015 ("ACOE Evaluation") relating to the San Jacinto River Waste Pits Superfund Site ("Site"). The purpose of the ACOE Evaluation was "to prepare an independent assessment of the Potentially Responsible Parties' (PRP) remedial alternative designs." The ACOE Evaluation also includes comments on the existing TCRA capping remedy. In preparing its Evaluation, the ACOE performed engineering analyses and modeling to compare its results with those reported by Anchor QEA (AQ) on behalf of the PRPs in the Draft Interim Feasibility Study dated March 2014 ("FS"). While it is not known whether the ACOE was provided with comments previously provided to EPA on the FS, the ACOE Evaluation supports many concerns and issues previously submitted to EPA by PHA.

HDR's current review is based on HDR's prior reviews of Site documents and its knowledge of CERCLA guidance. Comments provided herein are intended to supplement comments previously submitted to EPA on behalf of PHA.

The ACOE Evaluation includes analytical results of hydrodynamic, sediment, and contaminant transport and other independent analyses. HDR's review includes comments on the relevance of the results of these analyses to the remedy selection, but HDR did not perform any modeling for comparison with ACOE results or results reported in the PRP's FS.

Comments on the ACOE Draft Evaluation

Abstract – The authors should clarify in the abstract and some areas of the ACOE Evaluation that the scope of review was not "remedial alternative designs," but rather evaluations of the remedial alternatives and design of the Site cap.



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Executive Summary, Permanence of Capping – The term “losses” from the cap should be changed to “releases” from the capped area to more specifically convey the evaluation of contaminant release, not just loss of capping materials.

Executive Summary, Effectiveness of Capping – The statement in the second paragraph relating to the net sedimentation rate of Task 19 should clarify that the predicted net sedimentation rate discussed is averaged over the Site area described and over time simulated. The ACOE modeling provides more detailed results than those presented previously by the PRPs. The ACOE analyses show local areas and times of erosion, as well as sedimentation, which may provide a good perspective to EPA for its remedial alternatives evaluation. However, the clarification is needed because any period or area of erosion of the cap or contaminated materials needs to be considered and mitigated.

Executive Summary, Cleanup Level – The ACOE Evaluation states, “*Actively remediated areas have resulting exposures that yield risks well below the remediation action objectives and greatly reduce the overall site risk.*”

This statement seems to assume that active remediation would remove *all* materials above the cleanup level, with all other areas having lower concentrations. That, however, is not the assumption used in the PRPs’ analyses of possible remediation. Rather, the Remedial Alternatives Memorandum (December 2012) and FS assume that any sediment remedy remediates only limited areas so that each water body segments’ averaged surface sediment concentration is below the cleanup level. This is a far less extensive remediation than what the ACOE Evaluation seems to imply. Remediation to only reduce the averaged concentration, however, would not “greatly reduce the overall site risk.” ACOE’s interpretation should clarify whether its conclusions are based on the averages over water body segments, or all locations that exceed a cleanup level.

Project Background, Objectives and Tasks, Background (p. 1) –The ACOE Evaluation states, “Large scale groundwater extraction has resulted in regional subsidence of land in proximity to the Site that has caused the exposure of the contents of the northern impoundments to surface waters.” This statement ascribes the release of contaminants only to subsidence from groundwater withdrawal, but the Site’s history and Site documents reflect that various events may have caused or contributed to the release. If ACOE has definitively analyzed all possible causes of the release of contamination at the Site, it should provide support for its position or reference an analysis document. If



there is uncertainty or if groundwater subsidence is only a part of the mechanism of release, ACOE should modify its statement accordingly. It would also be helpful to the public's understanding if the size of the cap and the location/size of the impermeable geomembrane were identified in an additional Figure. In the fourth paragraph, last line, is PRP rather than RP the intended acronym?

Figure 1-1(p. 2) – The text and legend on the graphic are not legible.

Study Tasks, Task 7 (p. 3) – The reference to reliability is unclear in the statement, “Assess the long-term reliability (500 years) of the cap under the potential conditions within the San Jacinto River.” Long-term reliability (500 years) may be interpreted to mean analysis of the cap stability in the face of subsidence, compaction, sea level rise, changes in land use, and other conditions that might compromise the integrity of the cap over a period of 500 years. Such extensive projections, however, were not performed in Task 7 or other tasks of the ACOE Evaluation. Task 7 assessed the reliability under current conditions, and under rare conditions that are expected to have a 1 in 500 probability of occurrence any year. Similar references elsewhere in the ACOE Evaluation to “500 year,” “100 year” and “400 year” considerations should be similarly clarified to avoid misinterpretation.

Task 2 (p. 7 first paragraph) – The reference to 1.97 ft. rise in relative water level from subsidence and sea level rise over 100 years, makes it even more significant to not use the term “500 year” period or projection, as hydrologic conditions during that period will be dramatically different from those simulated in various tasks, including Task 7 and Task 16. Task 8 at Page 53, for example, uses the appropriate terminology for 1:400 event: “...is very low, likely less than 1 in 400 in any given year.” (See also above comment) This same 1.97 ft. rise in relative water level reference also counters the previous suggestion that subsidence was the sole cause of site inundation as stated in the project background.

Task 2 (p. 7 second paragraph) –It would facilitate public understanding if the ACOE provided the 1994 peak flow rate at the Lake Houston Dam and clarified how the peak stream flow of the 1994 storm and the peak flow rates of Hurricane Ike and Tropical Storm Allison compared.

Task 2 (p. 8) – Please provide additional information on what the historic scour was for the 1994 storm and how the model performed with respect to historic



observations. As currently reported, the historic scour in the area was stated to be 10 feet, while the model found a maximum of 5.9 feet, which was less than the reported scour. The discrepancy was not addressed other than to state that the reported historic scour was possibly unreliable. Without an accurate historic comparison, the model result cannot be assumed to be correct and may not be reflective of expected future conditions. It would also be helpful if the ACOE would provide additional information on how it was determined that the model could reasonably represent future scour events based on the comparison to the 1994 event.

Task 3, Evaluation of Assumptions in AQ (PRP's) Model Framework, Two Dimensional Depth Averaged Model (p. 27) – Both the ACOE models and the Anchor QEA models use vertically mixed assumptions with no stratification of flow. This may be a serious limitation of the models being used to simulate sediment transport because the models can only project transport of sediment in the downstream direction. This limitation is further recognized by the ACOE in Task 4, p. 48, of the ACOE Evaluation. Vertical differences in salinity (and temperature) may be relatively small, but the resulting stratified circulation is significant, especially to sediment transport (Abood 1974, URI, Peterson, Fischer, Okubo). For example, a minimal vertical salinity or temperature difference is indicative of stratified flow with stronger outflowing surface currents and stronger incoming bottom currents in each tidal cycle (except when fresh water flow ensures complete vertical mixing). The result of stratification is that averaged over a tidal cycle, the bottom water, which controls sediment transport, is flowing upstream. The ACOE stated “both models assumed that the SJR estuary was well mixed, so it was not possible to quantify the impact of this assumption.” There are, however, several dimensional analyses and models that can be used to evaluate the significance of this assumption. The ACOE or EPA may consider performing an analysis to determine if the well-mixed circulation models used are appropriate and reliable for this sediment transport application.

Task 4, Expanded Sensitivity Analysis (p. 32-35) – The ACOE Evaluation notes that maximum erosion was about double the “net erosion” over modeled periods. Since any erosion (not only “net erosion”) represents a release from the Site, all analyses should discuss maximum erosion events. They should be mitigated to the extent possible. The ACOE notes that its analyses of this task are continuing. When will the Task 4 be completed, and will they be available to EPA before a remedy selection is made? Since the hard bottom sensitivity analysis shows that the PRP's analyses are not conservative, its results should



be reassessed as to whether substantive conclusions of the FS change. The ACOE concludes that the PRP modeling results in underestimating erosion and overestimating net sedimentation. EPA should recognize that some of the FS analyses and projections may not be reasonably conservative when it considers those results in selecting its remedy for the Site.

Task 5 and 6 (p. 36) – Excellent review and recommendations are offered by the ACOE for the existing TCRA cap (where issues have been noted). The suggested refinements to the cap thickness and slope should be included in the prescribed remedy. Use of AquaGate or similar additives would reduce contaminant and cap material mobility if the disturbance from its injection would not cause greater releases than the additives would likely mitigate. Use of such additives should be carefully scoped (if applied). Also, a location map identifying the different cap sections would be helpful for public understanding and participation.

Task 7, Findings, Impacts of Floods (pp. 42-43) – The ACOE Evaluation does not indicate whether the spectrum of conditions simulated include those that produce a drop in mean water (westerly winds), which reduces the cross section and increases the flood velocities. This occurrence should be included among the storm conditions considered.

Task 7, Findings, Prop Wash (pp. 43-44) – The ACOE Evaluation states that the results of ACOE analyses for impacts that may be associated with prop wash from local boat traffic / operations are pending. When will these analyses be available for comment and EPA consideration in selecting a remedy for the Site?

Task 7, Impact of Substrate Material Erosion (pp. 45) – The ACOE Evaluation states that the modeling performed demonstrated that there was no substantial erosion of the cap's substrate material. Please clarify the task that identified this statement.

Task 8 (p. 46-54) – The ACOE analyzes possible barge strikes, but fails to note that correlations are likely between flood events and barge strikes. Better controls of barge moorings and navigation activities preceding storm events may minimize the possibility of barge strikes.

Task 9 (p. 55-60) – The ACOE Evaluation provides several pages of useful educational materials on Institutional Controls (ICs), which are not directly



specific to the Site. As with many sites, the implementation and enforcement of institutional controls is a concern. The ACOE should offer recommendations to EPA on the most effective ICs for this Site, and any guidance on how they might be made enforceable and reliable. Similarly, ACOE has noted in several Tasks that maintenance of the cap will be an essential ingredient of the protectiveness of the remedy. In that light, how will EPA ensure that the PRPs are responsible to maintain the cap and implement and enforce institutional controls? If they cannot be enforced, the remedy will not be fully protective of human health and the environment.

Task 9, Application of ICs and ECs to San Jacinto River Waste Pits Site (p. 64)

– The ACOE Evaluation notes that deed covenants could be used. We recommend that the most stringent controls be considered for the Site – e.g., deed restrictions.

Task 12, Residuals Controls (pp. 96-97)

– Neither the FS nor the ACOE Evaluation has noted the importance of bottom conditions on sediment stability or potential for remediation. No data have been reported on the nature of bottom debris at or near the Site. Interpretations in the ACOE Evaluation should expressly state assumptions as to the nature of the bottom conditions, or qualify the analysis to the extent that they may be impacted by bottom conditions, including natural or man-made debris near the Site.

Task 12, Summary of BMPs (p. 109-112)

– The ACOE Evaluation recommends BMPs for each remedial alternative. EPA should consider incorporating these recommendations in its remedy selection specifications.

Task 12, Development of New Full Removal Alternative to Minimize Sediment Resuspension and Residuals during Dredging/Removal (p. 112-132)

– The ACOE Evaluation includes a more comprehensive, objective and quantitative analysis for Alternative 6N than the analysis included in the FS. Specifically, the ACOE Evaluation scopes and evaluates various methods of removal for different cells of the Site and alternative methods for covering any residuals on the Site. EPA should consider the benefits versus costs and potential for releases of the full removal alternative developed by the ACOE, recognizing, in particular, the potential to specify removal of the shallow portion of the Eastern Cell.

Task 13, Assessing the validity of statements in the FS (p. 133-141)

– It would be helpful if the ACOE more directly addressed their determinations/conclusions



regarding the feasibility of the solidification, removal, and containment alternatives based on their reliability, implementability, constructability, and short-term effectiveness.

Task 14, Findings (p. 142) – The ACOE Evaluation reports that analyses are continuing for the full removal alternative developed in Task 12. When will the results of these analyses be available for review and comment?

Summary

It is recommended that EPA incorporate the ACOE's recommendations for specifications, operation/maintenance requirements, and institutional controls in its remedy selection.

Any questions concerning these comments should be communicated to Linda Henry, Port of Houston Authority.

Sincerely,

A handwritten signature in black ink, appearing to read 'Thomas Pease'.

Thomas Pease, P.E, PhD
Senior Project Manager

cc: Michael Musso, Neil McLellan HDR